FURUNO®

Back

INSTALLATION MANUAL
GPS NAVIGATOR
GP-80

1. EQUIPMENT LIST 1

2. DISPLAY UNIT 2

3. ANTENNA UNIT 3

4. WIRING 5

5. INITIAL SETTINGS 7

6. OPTIONAL DGPS 21

PACKING LISTS AND INSTALLATION MATERIALS

OUTLINE DRAWINGS

INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

PRINTED IN JAPAN

© FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, Japan

Telephone : 0798-65-2111
fax : 0798-65-4200

Your Local Agent/Dealer

All rights reserved. Printed in Japan

FIRST EDITION : SEP. 1995
Q1 : OCT. 06,2003

PUB.No. IME-43740-Q1

(TENI) GP-80

00080734101

IME43740Q10

⚠ SAFETY INSTRUCTIONS

⚠ WARNING

Do not work inside the equipment unless totally familiar with electrical circuits.

Hazardous voltage which can cause electrical shock, burn or serious injury exists inside the equipment.

Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Confirm that the power supply voltage is compatible with the voltage rating of the equipment.

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the display unit.

Use the correct fuse.

Use of a wrong fuse can cause fire or equipment damage.

Keep the following compass safe distances:

	Standard	Steering
Display unit	0.6 m	0.5 m

1. EQUIPMENT LIST

Standards

	Name	Type	Q'ty	Mass (kg)	Remarks
1	Antenna Unit	GPA-017S	1		
		GPA-018S			for DGPS
		GPA-019S			
2	Display Unit	GPR-020	1	2.2	Without Beacon RX
		GPR-020			With Beacon RX
3	Installation Materials	CP20-01900	1 set		See lists at end of manual.
		CP20-01920			
4	Spare Parts	SP20-00500	1 set		

Options

	Name	Type	Code No.	Remarks
1	Flush Mount Kit S	OP20-24	004-393-000	For display unit.
2	Flush Mount Kit F	OP20-25	004-393-280	
3	Antenna Cable Set	CP20-01700	004-372-110	See page 3.
		CP20-01710	004-372-120	
4	Right Angle Antenna Base	No.13-QA330	000-803-239	For antenna unit.
5	L-Type Antenna Base	No.13-QA310	000-803-240	
6	Handrail Antenna Base	No.13-RC5160	000-806-114	
7	Mast Mount Kit	CP20-01111	004-365-780	
8	Cable Assy	MJ-A6SPF0011-050 (03S9202)	000-132-244	5m, 6p-4p
		MJ-A6SPF0011-100 (03S9226)	000-132-336	10m, 6p-4p
		MJ-A7SPF0003-050 (20S0241)	000-136-730	5m, For DATA4
		20S0093	000-117-603	5m, MJ type 6P
		MJ-A6SPF0012-050 (64S4073)	000-134-424	Cross cable 5m
		MJ-A6SPF0012-100 (64S4071)	000-133-817	Cross cable 10m
9	Beacon Receiver Set	GR-800	–	
10	Rectifier	PR-62	000-013-485	For 100VAC mains
			000-013-486	For 220VAC mains

2. DISPLAY UNIT

The display unit can be installed with either of four methods as shown below. Refer to the outline drawing page D-2, D-3, and D-4.

- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the display unit away electromagnetic field generating equipment such as motor, generator.
- Allow sufficient maintenance space and a sufficient slack in cables for maintenance and repair.
- If vibration is a problem, tilt the display unit so it contacts the vibration absorbers attached to the inside of the hanger (tilted within 5 °).

Table Top and Overhead Mounting

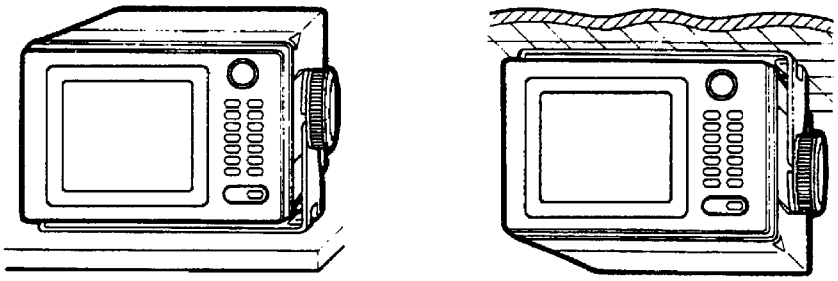


TABLE TOP **OVERHEAD**

Display unit mounting methods

Flush mounting type F

An optional flush mount kit type F is required. For details, see outline drawing page D-2.

Name	Type	Code No.
Flush Mount Kit F	OP20-25	004-393-280

Flush mounting type S

An optional flush mount kit type S is required. For details, see outline drawing page D-3.

Name	Type	Code No.
Flush Mount Kit S	OP20-24	004-393-000

3. ANTENNA UNIT

Mounting

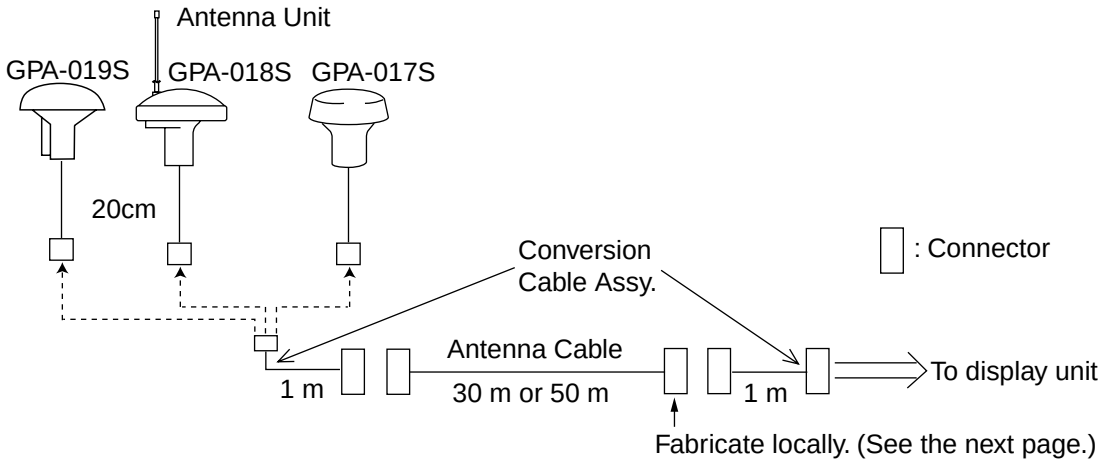
Install the antenna unit referring to the installation diagram on page D-4. When selecting a mounting location for the antenna unit, keep in mind the following points.

- **Select a location out of the radar beam.** The radar beam will obstruct or prevent reception of the GPS satellite signal.
- **Be sure the location offers a clean line-of-sight to satellite.** Objects within line-of-sight to a satellite, for example, a mast or funnel, block reception and cause prolonged acquiring time or interruption of position fix.
- **Mount the unit as high as possible.** Mounting the antenna as high as possible keeps it free of water spray, which can intercept reception of GPS satellite signal, if water spray is frozen.
- **The antenna unit GPA-018S must be grounded.** Connect ground wire of 1.25 sq or larger (local supply) between unit and a stainless steel screw fastened to the mast.

Extending Antenna Cable Length

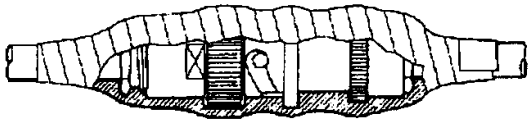
The standard cable is 15m long. 30m and 50m long extension cable sets are optionally available. See page 4.

◆Extension cable line-up
Fabricate the end of antenna cable and attach the coaxial connector. Details are shown on next page.



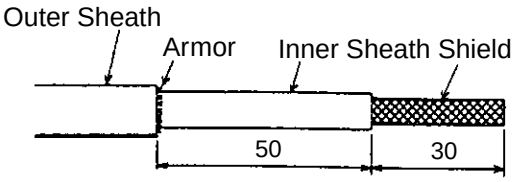
Extension Cable Line-up

◆Waterproofing the connector
Wrap connector with vulcanizing tape and then vinyl tape. Bind the tape end with cable-tie.

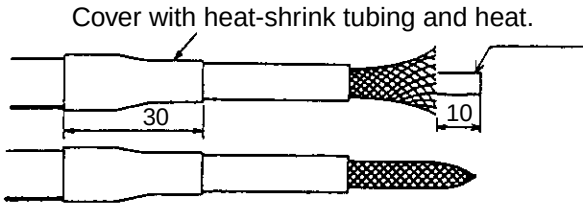


How to waterproof the antenna

How to attach the N-P-8DFB connector

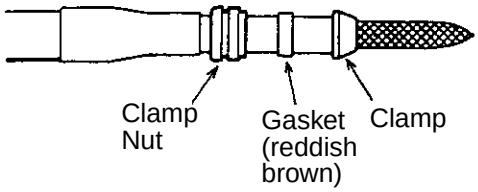


Remove outer sheath and armor by the dimensions shown left.
Expose inner sheath and shield by the dimensions shown left.

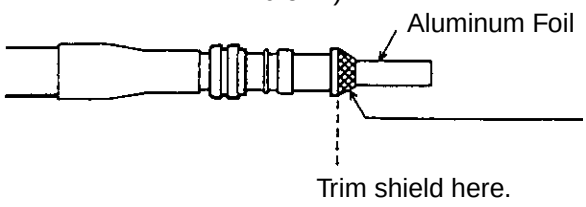


Cut off insulator and core by 10mm.

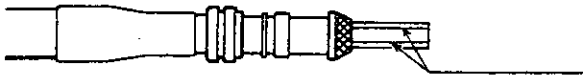
Twist shield end.



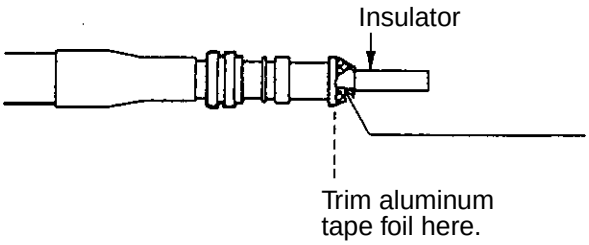
Clip on clamp nut, gasket and clamp as shown left.



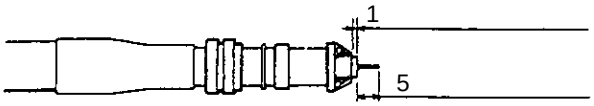
Fold back shield over clamp and trim.



Cut aluminum foil at four places, 90° from one another.

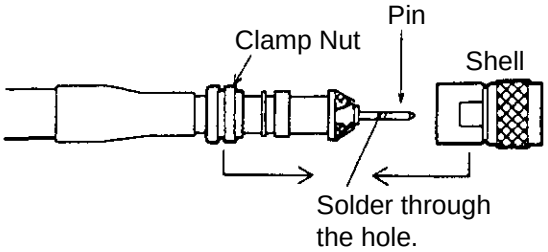


Fold back aluminum foil onto shield and trim.



Expose the insulator by 1mm.

Expose the core by 5mm.



Slip the pin onto the conductor. Solder them together through the hole on the pin.

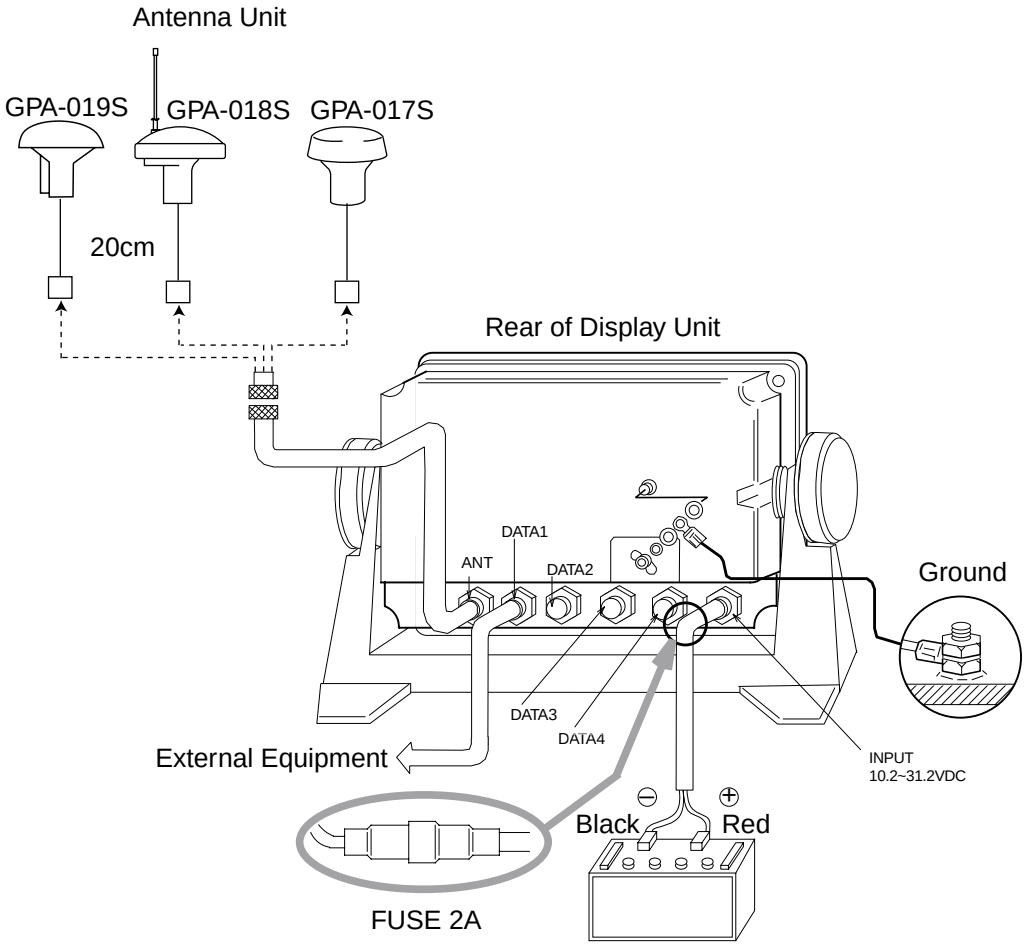
Insert the pin into the shell. Screw the clamp nut into the shell.
(Tighten by turning the clamp nut. Do not tighten by turning the shell.)

4. WIRING

The figure below shows the connection of cables on rear of display unit.

⚠ CAUTION

Ground the receiver to prevent loss of sensitivity and mutual interference.



Connection of cables on display unit

Grounding

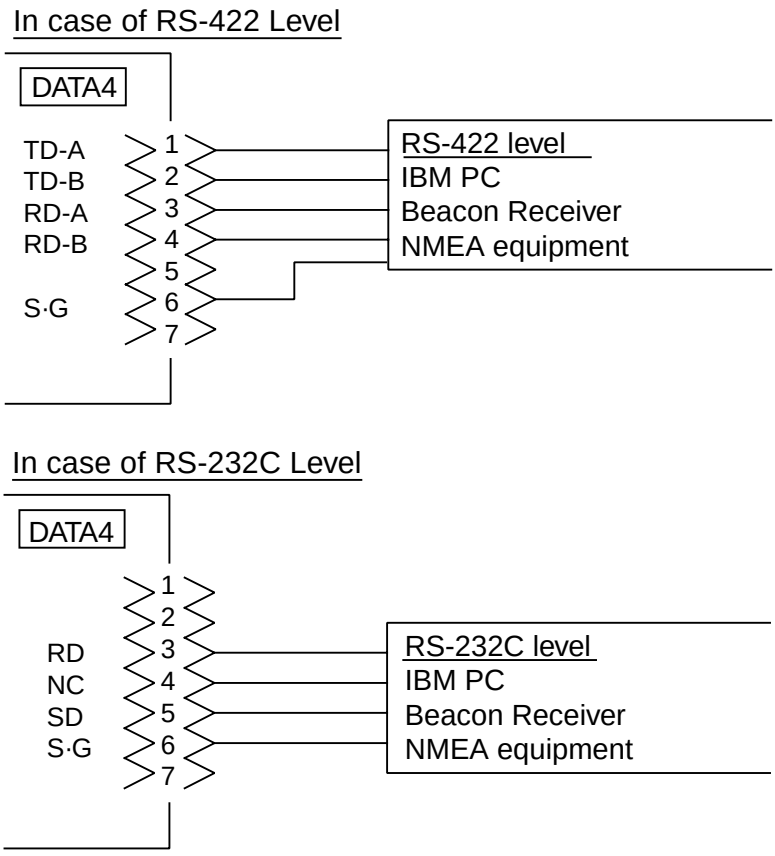
The display unit contains several CPUs. While they are operating, they radiate noise, which can interfere with other radio equipment. Ground the unit as follows to prevent it.

- The grounding wire should be 1.25sq or larger.
- The grounding wire should be as short as possible.

External Equipment

The DATA1, DATA2, and DATA3 ports are used to connect an external equipment such as autopilot, remote display, navigation equipment. Refer to the interconnection diagram on page S-1 for connection of DATA1, DATA2 and DATA 3 port. The DATA4 port is used to connect NMEA equipment, IBM-PC or DGPS beacon receiver as follows;

Connection of DATA4 port

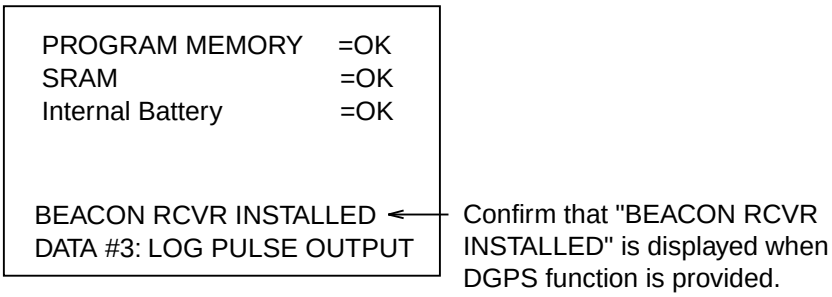


NOTE: See page 15 for selection of input/output signal.

5. INITIAL SETTINGS

Checking Operation

1. Turn on the GP-80.
2. Confirm that "OK" and "BEACON RCVR INSTALLED" are display on the self-test display.


PROGRAM MEMORY =OK
SRAM =OK
Internal Battery =OK
BEACON RCVR INSTALLED
DATA #3: LOG PULSE OUTPUT
Confirm that "BEACON RCVR INSTALLED" is displayed when DGPS function is provided.

Self-test display at equipment start up

3. At the GP-80, press [MENU ESC], [8] and [1]. Confirm that "BEACON OK" is displayed.

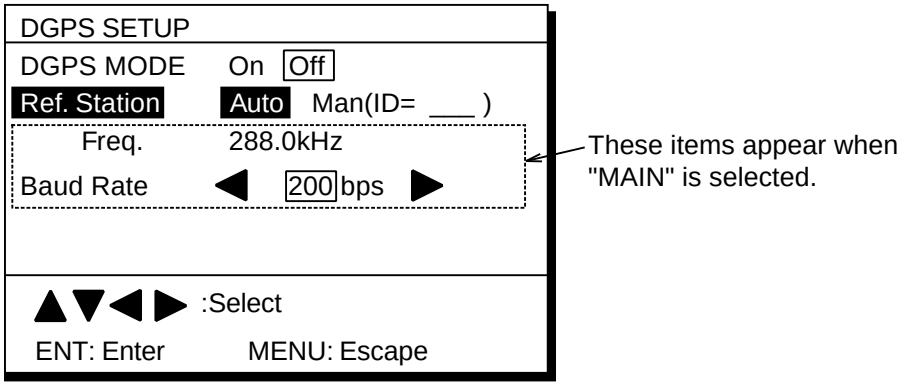
DGPS Setup

The default setting is "manual".

Automatic DGPS setup

The GR-800 can automatically select optimum reference station by feeding it position data. If it takes more than 5 minutes to fix DGPS position at the automatic mode, switch to manual mode. Use at manual mode when a external beacon receiver has no automatic function of station selection.

1. Press [MENU ESC], [9] and [7] to display the DGPS SETUP menu.



DGPS SETUP menu

2. Press ▲ or ▼ to select DGPS MODE and press ◀ to select On.
3. Press ▲ or ▼ to select Ref. Station.
4. Press ◀ to select Auto.

5. Press the [NU/CU ENT] key.
6. Press the [MENU ESC] key.

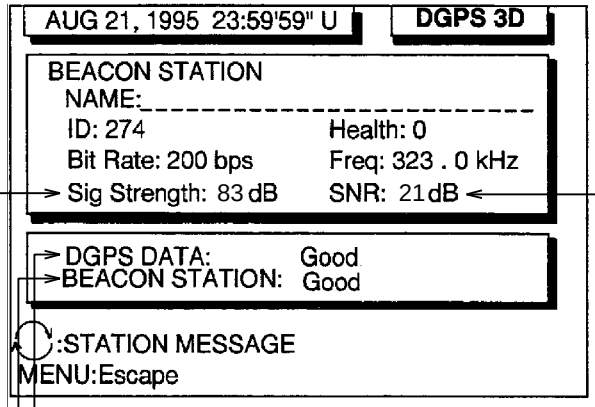
Manual DGPS setup

Enter four digit ID number, frequency and baud rate of station, referring to the DGPS list in the GP-80 operator's manual.

1. Press [MENU ESC] [9] and [7] to display the DGPS SETUP menu.
2. Press ▲ or ▼ to select DGPS MODE and press ◀ to select On.
3. Press ▲ or ▼ to select Ref. Station.
4. Press ▶ to select Man.
5. Enter four digit ID number. You can clear an entry by the [CLEAR] key. If the number entered is invalid, the buzzer sounds and the message "INVALID ID" appears on the display for three seconds.
   If there is no ID number, press the [NU/CU ENT] key.
6. Press the [NU/CU/ENT] key.
7. Enter frequency in four digits (283.5 kHz to 325.0 kHz).
8. Press the [NU/CU ENT] key. "Band Rate" appears in reverse video.
9. Press ◀ or ▶ to select band rate; 25, 50, 100 or 200bps.
10. Press the [MENU ESC] key.

DGPS Operation checking

1. Press [MENU ESC] and [7].
2. Press [↻] several times to display the following.



Error rate of connection data

This value is between 1 to 22. The higher the value, the better the reception of beacon signal. When this value is less than 20, the error is included in the correction data. In this time, position fixing is done by using past position data. When the ship is in the service area of a beacon station, this value should be 21 or 22. If not, check as follows.

- Check the grounding.
- Check the radar beam interference.
- Check the noise of power generator of the ship.

Beacon signal status

Reference station status

DGPS signal strength

This value is between 1 and 84. The higher the value, the stronger the signal. If a noise appears at reception band width, the value becomes bigger.

Input/Output Setting

The GP-80 can output navigation information to external equipment. For example, it can output position data to a radar or echo sounder for display on their display screen. You can convert a Loran Plotter to a GPS Plotter with position data from the GP-80.

Before selecting data to output, confirm what data the external equipment requires. Output necessary data only. Outputting unnecessary data can cause receiving problems at the external equipment.

Talker

All data transmitted by marine electronics equipment is prefixed with a two character code which tells external equipment what equipment is transmitting data. This two character code is called the talker. The GP-80 contains the talkers GP, LC and DE.

Because GPS is a relatively new system some early model equipment do not recognize the GP talker name. In this case transmit data using a conventional talker, one the equipment recognizes, such as Loran C.

Data format and data output availability

Output data sentence of IEC 61162-1 and NMEA 0183 Ver. 1.5/V2.0.

AAM: Waypoint arrival alarm
APB: Autopilot sentence B
magnitude of cross track error, direction to steer, arrival alarm, bearing to waypoint
("Heading to steer to destination waypoint data" not used)
BOD: Bearing-origin to destination
BWC: Bearing and distance to waypoint-great circle
BWR: Bearing and distance to waypoint-rhumb line
BWW: Bearing-waypoint to waypoint
DTM: Datum reference
GGA: Global positioning system (GPS) fix data
time of fix, latitude, longitude, quality indicator, number of satellites in use, DOP, altitude, geoidal separation
("age of dgps data" and "differential reference station ID" not used)
GLL: Geographic position-latitude/longitude
GNS: GNSS fix data
RMB: Recommended minimum navigation information cross track error, direction to steer, origin and destination waypoint ID, destination waypoint latitude and longitude, range and bearing of destination waypoint, destination closing velocity, arrival alarm
RMC: Recommended minimum specific GPS/TRANSIT data
UTC of position fix, latitude and longitude, ground speed and course, date, magnetic variation
RTE: Routes
VTG: Course over ground and ground speed
WCV: Waypoint closure velocity
WNC: Distance-waypoint to waypoint-great circle
WPL: Waypoint location
XTE: Cross-track error, measured
ZDA: Time and date
ZTG: UTC and time to destination waypoint

Also, following NMEA 0183 Ver. 1.5 sentences are output.

APA: Autopilot sentence "A"
magnitude of cross track error, direction to steer, arrival alarm, bearing origin to destination.
WNR: Distance-waypoint to waypoint-rhumb line
ZLZ: Time of day
UTC, local time, local zone

Input data sentence of NMEA 0183 Ver. 1.5/2.0

Checksum is checked if attached, and if any errors are found, the sentence becomes invalid.
Talker ID is not distinguished.

DBT: Depth below transducer

$--DBT, 1234.5, f, 1234.5, M, 1234.5, F*12<CR><LF>

a b c d e f g

a, b: Water depth, feet
c, d: Water depth, m
e, f: Water depth, fathoms
g: checksum

DPT: Depth

$--DPT, 1234.5, 1234.5*23<CR><LF>

a b c

a: Water depth relative to the transducer, meters
b: Offset from transducer, meters...not used
c: checksum

MTW: Water temperature

$--MTW, 23.4, C*34<CR><LF>

a b c

a, b: Temperature, degrees C
c: checksum

TLL: Target latitude and longitude

$--TLL, 00, 3445.678, N, 13521.234, E, abcd, 121530, T, R*A5<CR><LF>

a b c d e f g h i j

a: Target number...not used
b, c: Latitude
d, e: Longitude
f: Target name...not used
g: UTC...not used
h: Target status...not used
i: Reference target...not used
j: checksum

FURUNO proprietary sentences

AGFPA: Autopilot information from FURUNO autopilot equipments

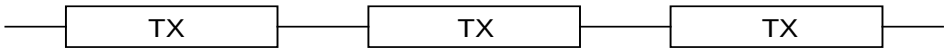
Port	Input	Output
DATA1 DATA2	NMEA 0183 Ver. 1.5 /2.0 AGFPA , DBT, DPT, MTW, TLL	IEC 61162-1/NMEA 0183 Ver.1.5/ Ver.2.0 AAM, APA, APB, BOD, BWC, BWR, BWW, GGA, GLL, GNS, RMB, RMC, VTG, WCV, WNC, WNR, WPL, XTE, ZDA, ZLZ, ZTG, Rnn, RTE, DTM
DATA3	External MOB	LOG PULSE
		Same as the data output form “DATA1”
DATA4	DGPS or general data (Selected by menu)	General data
		IEC 61162-1/NMEA 0183 Ver.1.5/ Ver.2.0 AAM, APA, APB, BOD, BWC, BWR, BWW, GGA, GLL, GNS, RMB, RMC, VTG, WCV, WNC, WNR, WPL, XTE, ZDA, ZLZ, ZTG, Rnn, RTE, DTM

General data

1) Input of buoy information
   Floppy disk stored buoy information is supplied from PC connected at DATA4 port.
2) Input of waypoint data
   Connect YEOMAN equipment to DATA4 port.
3) Input and output of waypoint / route data

Rate of operation

The TX rate of operation is the percentage of data output in one second, and it appears on the screen. If short intervals are assigned to many sentences, the rate of operation increases as illustrated below



A rate of operation exceeding 100% is impractical. For better performance, the rate of operation should be less than 90%.

When the external equipment cannot display correct data input from the GP-80, the rate of operation should be lowered.

For example, set a rate of operation less than 60% for the Temperature Indicator TI-20.

DATA 1 output setting

1) Press [MENU] [9] and [3]. The DATA 1, 3 OUTPUT SETUP menu appears.

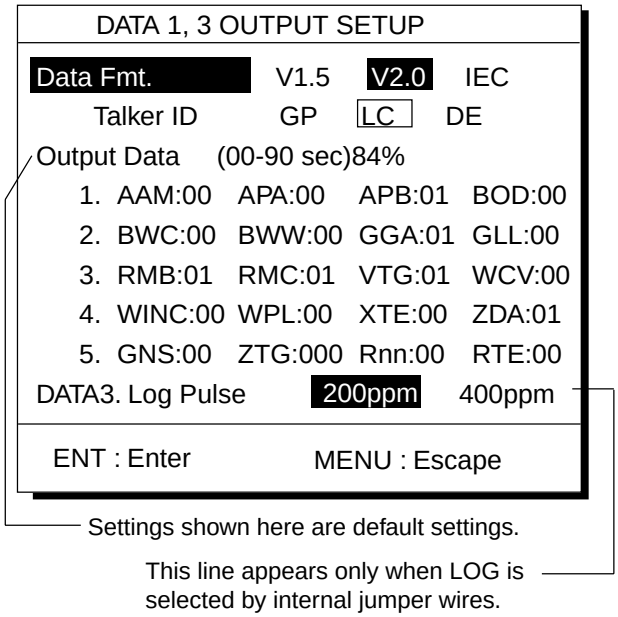

DATA 1, 3 OUTPUT SETUP
Data Fmt. V1.5 V2.0 IEC
Talker ID GP LC DE
Output Data (00-90 sec)84%
1. AAM:00 APA:00 APB:01 BOD:00
2. BWC:00 BWW:00 GGA:01 GLL:00
3. RMB:01 RMC:01 VTG:01 WCV:00
4. WINC:00 WPL:00 XTE:00 ZDA:01
5. GNS:00 ZTG:000 Rnn:00 RTE:00
DATA3. Log Pulse 200ppm 400ppm
ENT : Enter MENU : Escape
Settings shown here are default settings.
This line appears only when LOG is selected by internal jumper wires.

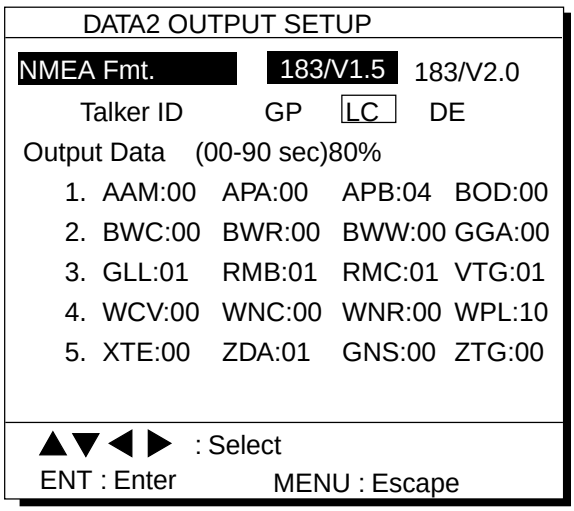
Figure 5-1 DATA 1, 3 OUTPUT SETUP menu

2) Press ▲ or ▼ to select Data Fmt.
3) Press ◀ or ▶ to select V1.5, V2.0 or IEC.
4) Press the [ENT] key. Talker ID appears in reverse video.
5) Press ◀ or ▶ to select GP, LC or DE.
6) Press the [ENT] key.
7) Enter Tx interval for each output data sentence in line 1. Tx interval is available in 00, 01, 02, 03, 04, 05, 06, 10, 15, 20, 30, 60, and 90 sec.
8) Press the [ENT] key.
9) Enter Tx interval for each output data sentence in lines 2 through 5. Press the [ENT] key after setting each line.

In great circle calculation, BWC and WNC are output but BWR and WNR are not. In rhumb line navigation, BWR and WNR are output but BWC and WNC are not.
The total data output are shown by percentage on the third line.
For best results the total output should be less than 90%; lengthen the Tx interval of less important data to make the total output less than 90%.

DATA 2 output setting

1) Press [MENU] [9] and [4]. The DATA 2 OUTPUT SETUP menu appears.



Setting shown here are default settings.

Figure 5-2 DATA 2 OUTPUT SETUP menu

2) Follow the procedure for setting DATA 1 output.

DATA 3 output setting

The DATA 3 can output NMEA 0183 (V1.5/V2.0) /IEC 61162-1 data or log pulse by selecting inner jumper wire. For NMEA 0183 (V1.5/V2.0) /IEC 61162-1, the same signal of DATA 1 is output from DATA 3.

Selection of NMEA0183 or log pulse

Output data / NAV board	NMEA 0183 (V1.5/ V2.0)/IEC 61162-1	Log pulse
JP4 (2 pcs.)	ON	OFF
JP5 (3 pcs.)	OFF	ON

Rate of log pulse output

500 mA Max.
50 VDC

Procedure for setting of log pulse rate

1) Press [MENU] [9] and [3].
2) Press ▲ or ▼ to select DATA 3. Log Pulse.
3) Press ◀ or ▶ to select log pulse for external equipment; 200ppm or 400ppm.
4) Press the [ENT] key.
5) Press the [ESC] key.

Setting DATA 4 to Data Output

1) Press [MENU] [9] and [5]. The DATA 4 I/O SETUP menu appears.

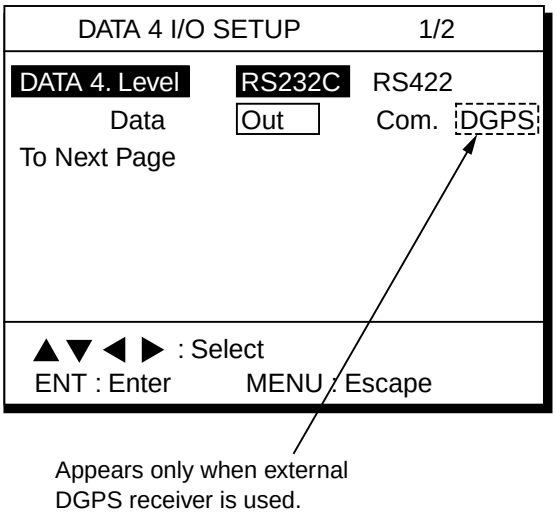


Figure 5-3 DATA 4 I/O SETUP menu

2) Press ▲ or ▼ to select Level.
3) Press ◀ or ▶ to select level of external equipment; RS232C or RS422.
4) Press the [ENT] key.
5) Press ◀ or ▶ to select Out.
6) Press ▼ to select to Next Page. The DATA 4 I/O SETUP menu appears.

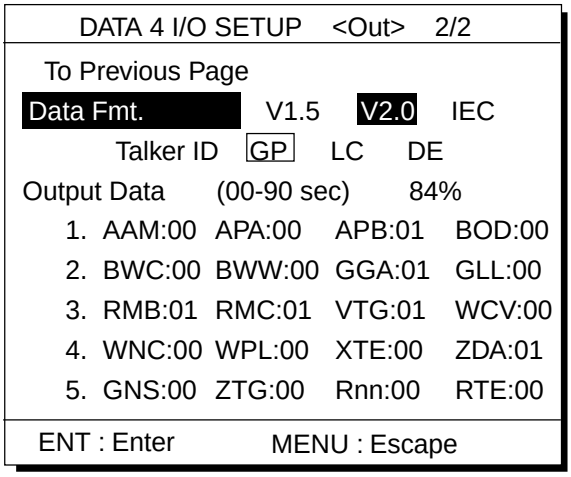


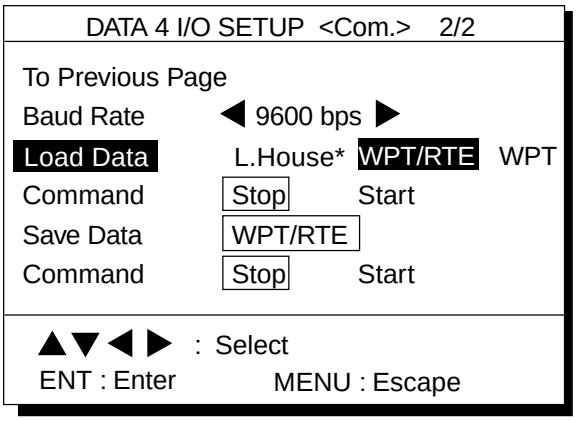
Figure 5-4 DATA 4 I/O SETUP menu

7) Follow "DATA 1 output setting" from step 2.

Setting DATA 4 to “COM.” (general data)

Waypoints and Routes data can be received from a personal computer, through the DATA 4 port.

1) Press [MENU] [9] and [5].
2) Press ▲ or ▼ to select Level.
3) Press ◀ or ▶ to select level of personal computer; RS232C or RS422.
4) Press the [ENT] key.
5) Press ▶ to select Com.
6) Press ▼ to select To Next Page. The DATA 4 I/O SETUP menu appears.


DATA 4 I/O SETUP <Com.> 2/2
To Previous Page
Baud Rate ◀ 9600 bps ▶
Load Data L.House* WPT/RTE WPT
Command Stop Start
Save Data WPT/RTE
Command Stop Start
▲▼◀▶ : Select
ENT : Enter MENU : Escape

*: Not used.

Figure 5-5 DATA 4 I/O SETUP menu

7) Press ▲ or ▼ to select Baud Rate.
8) Press ◀ or ▶ to select baud rate; 4800bps, 9600bps, or 19200bps.
9) Press the [ENT] key.
10) Press ◀ or ▶ to select WPT/RTE.
11) Press ▼ to select Command. Stop, on the same line as Command, appears in reverse video.
12) Press ▶ to select Start. The message shown in Figure 5-6 appears.

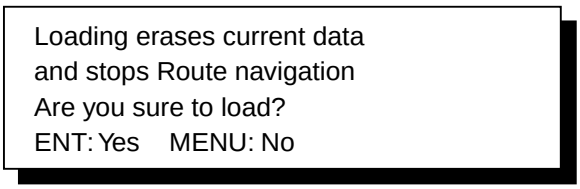


Figure 5-6

13) Press the [ENT] key. The message shown in Figure 5-7 appears while data is being loaded.

Figure 5-7

14)Output data from the computer. When data is loaded, the cursor shifts to Stop.
15)Press the [ESC] key.

Setting DATA 4 to DGPS

An external DGPS receiver can be connected to the DATA 4 port.
Follow the procedure below to setup the GP-80 according to the specifications of the DGPS receiver.

1) Press [MENU] [9] and [5].
2) Press ▲ or ▼ to select Level.
3) Press ◀ or ▶ to select level; RS232C or RS422.
4) Press the [ENT] key.
5) Press ◀ or ▶ to select DGPS.
6) Press ▼ to select To Next Page.

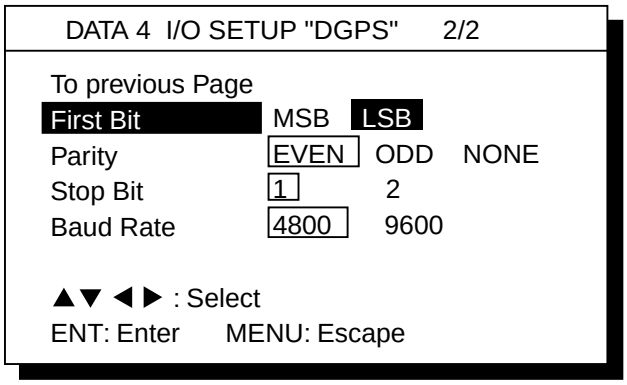

DATA 4 I/O SETUP "DGPS" 2/2
To previous Page
First Bit MSB LSB
Parity EVEN ODD NONE
Stop Bit 1 2
Baud Rate 4800 9600
▲▼ ◀ ▶ : Select
ENT: Enter MENU: Escape

Figure 5-8 DATA 4 I/O SETUP "DGPS" 2/2 menu

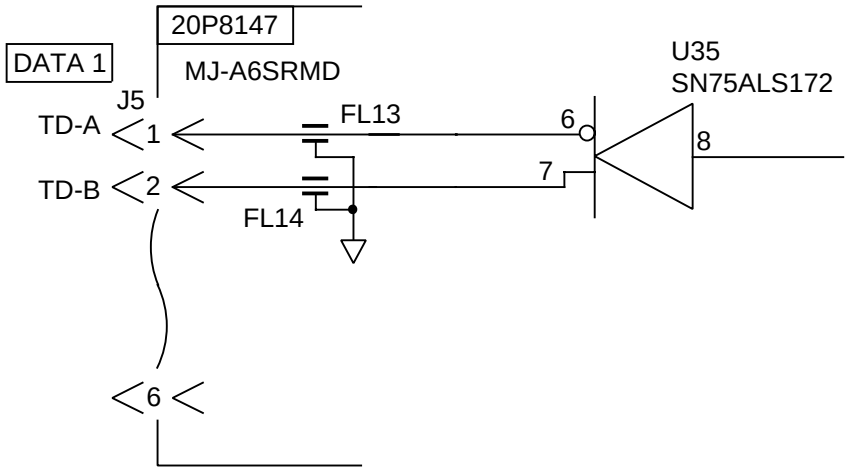
7) Press ▲ or ▼ to select First Bit.
8) Press ◀ or ▶ select first bit; MSB or LSB.
9) Press ▼ to select Parity Bit.
10)Press ◀ or ▶ to select parity bit; EVEN, ODD or NONE.
11)Press ▼ to select Stop Bit.
12)Press ◀ or ▶ to select stop bit; 1 or 2.
13)Press ▼ to select Baud Rate.
14)Press ◀ or ▶ to select baud rate; 4800 or 9600.
15)Press the [ENT] key.
16)Press the [ESC] key.

Interface Documentation

"DATA1" Port

⊙ IEC 61162-1/NMEA 0183 Ver. 1.5 Output

- Output Schematic Diagram (Talker)

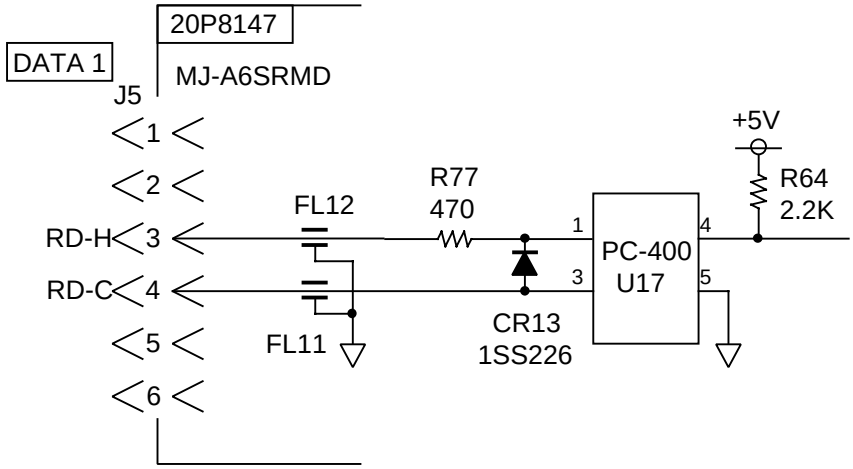


- Output Drive Capability

  Max. 10mA
- IEC 61162-1 output subject to the standard of IEC 61162-1 First edition 1995-11.
- Output Sentence is described on page 8 and 9. Each sentence is output at the interval entered.

⊙ NMEA 0183 Input

- Input Schematic Diagram (Listener)



- Load Requirements

  Isolation: opto coupler

  Input Impedance: 470 Ω

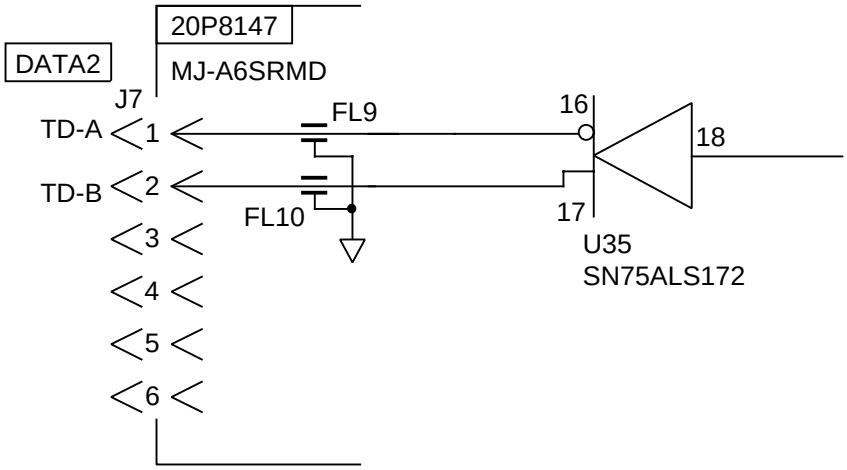
  Max. Voltage: ±15V

  Threshold: 3mA (In case of FURUNO device talker connection)
- Input Sentence is described on page 11.

"DATA2" Port

⊙ IEC 61162-1/NMEA 0183 Ver. 1.5/Ver. 2.0 Output

- Output Schematic Diagram (Talker)

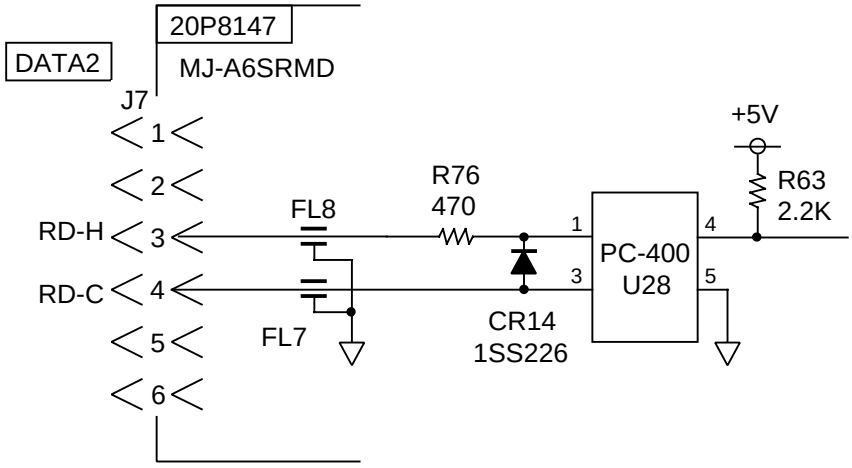


- Output Drive Capability

  Max. 10mA
- IEC 61162-1 output is subject to the standard IEC 61162-1 First edition 1995-11.
- Output Sentence is described on page 8 and 9. Each sentence is output at the interval entered.

⊙ NMEA 0183 Input

- Input Schematic Diagram (Listener)



- Load Requirements

  Isolation: opto coupler

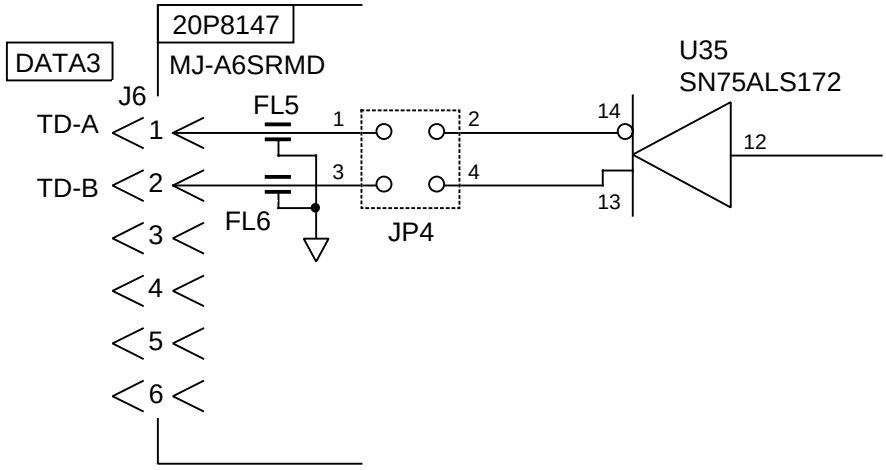
  Input Impedance: 470 Ω

  Max. Voltage: ±15V

  Threshold: 3mA (In case of FURUNO device talker connection)
- Input Sentence is described on page 8 and 9.

"DATA3" Port

- The output signal of this port is changed by jumper JP4 and JP5 between data out (IEC 61162-1/NMEA 0183 Ver. 1.5/Ver. 2.0) and log pulse.
- In case of data out, the same data of DATA1 port (#1 & #2) is output.
- Output Schematic Diagram (Talker)



- Output Drive Capability
  Max. 10mA

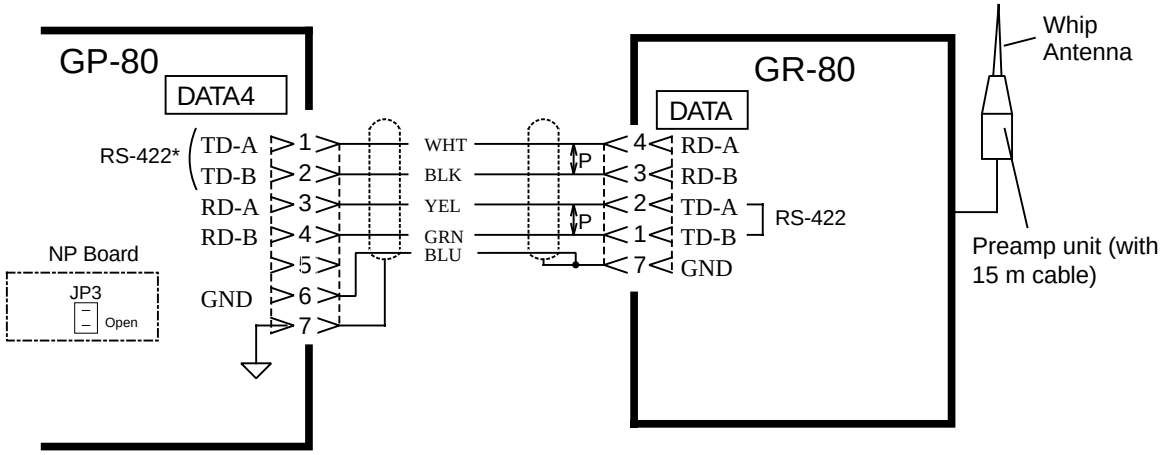
"DATA4" Port

IN/OUT signal is selected by the menu among the output of IEC 61162-1, NMEA 0183 Ver. 1.5/Ver. 2.0, PC output/input and DGPS signal. Also, to select DGPS signal, jumper JP3 is required to connect "external DGPS receiver."
RS-232C or RS-422 level can be selected by the menu.
In case of output of IEC 61162-1, NMEA 0183 Ver. 1.5/Ver. 2.0,

- Data format can be selected by the menu between IEC 61162-1 and NMEA 0183 Ver. 1.5/Ver. 2.0.
- Output sentence is described on page 8 and 9.
- Each sentence is output at the interval entered.

6. OPTIONAL DGPS

Beacon Receiver Set GR-80



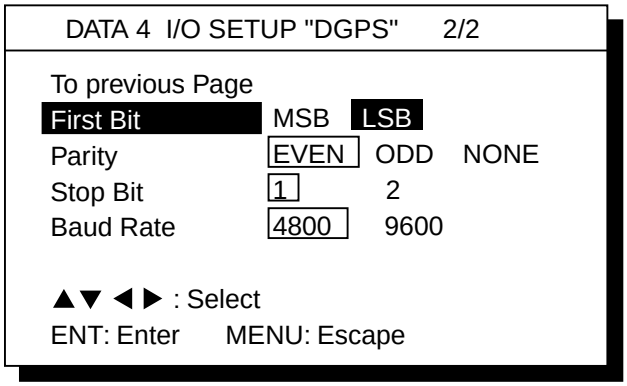
* This connection is required for L/L Auto mode of GR-80.

When the GP-80 is connected with Beacon Receiver GR-80, do the setting as follows.

Signal level	RS-422 *1
First Bit	LSB
Parity Bit	NONE
Stop Bit	1
Communication Speed	4800 or 9600 *1

*1: Coincide with the setting of the Beacon Receiver GR-80.

1) Press [MENU ESC] [9] and [5].
2) Press ▲ or ▼ to select Level.
3) Press ◀ or ▶ to select level; RS232C or RS422.
4) Press the [NU/CU/ENT] key.
5) Press ◀ or ▶ to select DGPS.
6) Press ▼ to select To Next Page.


DATA 4 I/O SETUP "DGPS" 2/2
To previous Page
First Bit MSB LSB
Parity EVEN ODD NONE
Stop Bit 1 2
Baud Rate 4800 9600
▲▼ ◀ ▶ : Select
ENT: Enter MENU: Escape

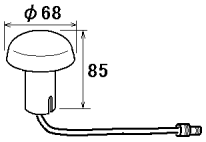
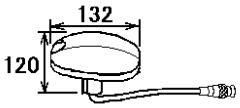
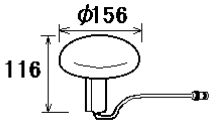
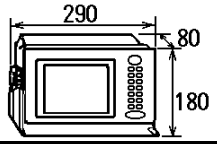
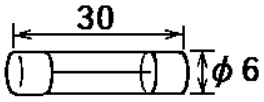
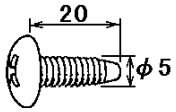
DATA 4 I/O SETUP "DGPS" 2/2 menu

7) Press ▲ or ▼ to select First Bit.
8) Press ◄ or ► to select first bit; MSB or LSB.
9) Press ▼ to select Parity.
10)Press ◄ or ► to select parity bit; EVEN, ODD or NONE.
11)Press ▼ to select Stop Bit.
12)Press ◄ or ► to select stop bit; 1 or 2.
13)Press ▼ to select Band Rate.
14)Press ◄ or ► to select band rate; 4800 or 9600.
15)Press the [MENU ESC] key.

PACKING LIST

20AM-X-9851 -10 1/1

GP-80-**-0/0-HK

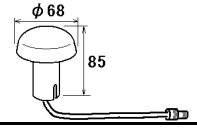
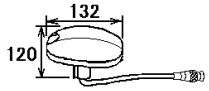
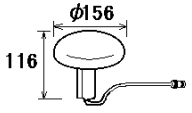
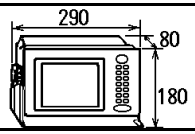
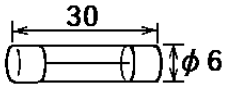
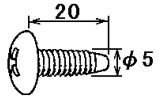
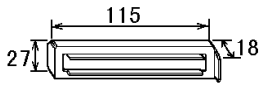
NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		GPA-017S 000-040-537**	1 (*1)
空中線部 ANTENNA UNIT		GPA-018S 000-041-462	1 (*1)
空中線部 ANTENNA UNIT		GPA-019S 000-142-545	1 (*1)
受信演算部 DISPLAY UNIT		GPR-020-E-N 000-040-542**	1
予備品 SPARE PARTS		**SP20-00500**	
ﾋｭｰｽﾞ FUSE		FGBO-A 2A AC125V 000-549-062	3
工事材料 INSTALLATION MATERIALS		**CP20-01101**	
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ 000-802-081	4
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0003-050 000-117-603	1
ｹｰﾌﾞﾙ組品MJ POWER CABLE		MJ-A2SPF0014-030 (VV0.75X2C *3M*) 000-128-522	1
ｹｰﾌﾞﾙ組品 ANTENNA CABLE ASSY.		TNC-PS-3D-15 20S0216 000-133-670	1

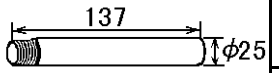
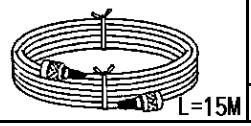
1.ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

2.(*1)の空中線部は仕様により決定されます。
ANTENNA UNIT HAS BEEN DETERMINED BY SPECIFICATION.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST GP-80-**-1/1-HK

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		GPA-017S 000-040-537**	1 (*1)
空中線部 ANTENNA UNIT		GPA-018S 000-041-462	1 (*1)
空中線部 ANTENNA UNIT		GPA-019S 000-142-545	1 (*1)
受信演算部 DISPLAY UNIT		GPR-020-E-N 000-040-542**	1
予備品 SPARE PARTS		**SP20-00500**	
ﾋｭｰｽﾞ FUSE		FGB0-A 2A AC125V 000-549-062	3
工事材料 INSTALLATION MATERIALS		**CP20-01101**	
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ 000-802-081	4
工事材料 INSTALLATION MATERIALS		**CP20-01111**	
取付補助金具 INSTALLING SPACER		20-007-3012-1 100-183-271	1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾊﾟｲﾌﾟ PIPE		20-007-3011-2 100-183-262	1
ﾊﾟｰｶｰｸﾗﾝﾌﾟ HOSE CLAMP		NO.6348 SUS303 000-805-906	2
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0003-050 000-117-603	1
ｹｰﾌﾞﾙ組品MJ POWER CABLE		MJ-A2SPF0014-030 (VV0.75X2C *3M*) 000-128-522	1
ｹｰﾌﾞﾙ組品 ANTENNA CABLE ASSY.		TNC-PS-3D-15 20S0216 000-133-670	1

1.ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.
2.(*1)の空中線部は仕様により決定されます。
ANTENNA UNIT HAS BEEN DETERMINED BY SPECIFICATION.
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

C4374-Z07-F

FURUNO

CODE NO.		20AG-X-9404 -1
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

GP-80,GP-90,SC-55,GP-3500/F
GP-1850,GP-1650,FA-100,GP-1640/F
SC-60/120,GD/GP-280/680/380

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	ｱﾝﾃﾅｹｰﾌﾞﾙ組品 ANTENNA CABLE ASSY.	 L=30M	8D-FB-CV *30M*		1	選択 TO BE SELECTED
			CODE NO.	000-111-547		
2	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=50M	8D-FB-CV *50M*		1	選択 TO BE SELECTED
			CODE NO.	000-117-599		

FURUNO ELECTRIC CO .,LTD.

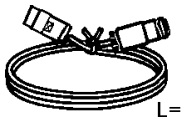
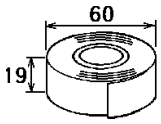
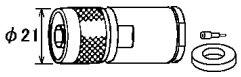
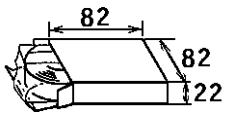
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	004-372-420	20AG-X-9405 -1
TYPE	CP20-01701	1/1

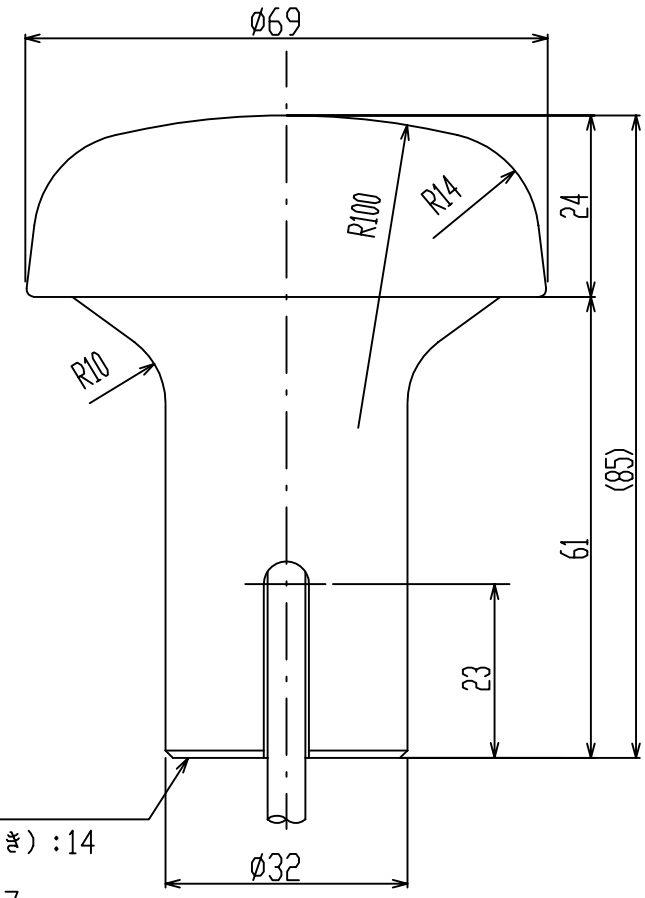
工事材料表

INSTALLATION MATERIALS

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	変換ｹｰﾌﾞﾙ組品 CONVERT CABLE ASSY.		NJ-TP-3DXV-1		2	
			CODE NO.	000-123-809		
2	ﾋﾞﾆｰﾙﾃｰﾌﾟ VINYL TAPE		NO360 02X19X10000 ｸﾛ ｴｽﾛﾝ		1	
			CODE NO.	000-835-215		
3	ｺﾈｸﾀ(N) CONNECTOR		N-P-8DFB		1	
			CODE NO.	000-111-549		
4	絶縁ﾃｰﾌﾟ SELF-BONDING TAPE		Uﾃｰﾌﾟ 0.5X19X5M		1	
			CODE NO.	000-800-985		

FURUNO ELECTRIC CO .,LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

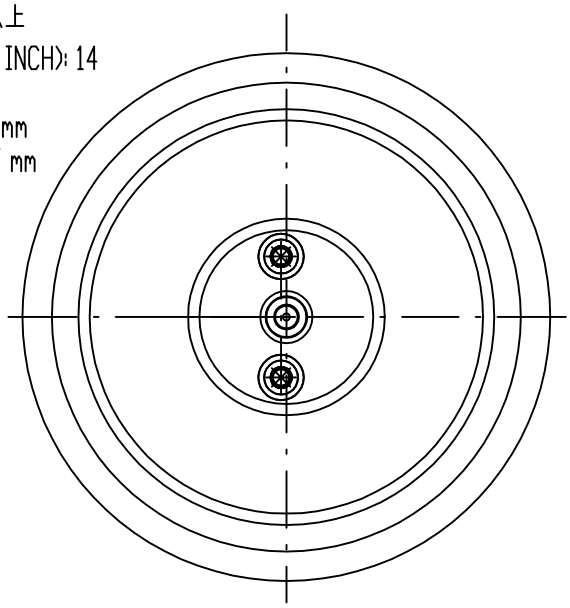


寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

表1 TABLE 1

1-14UNS1B
ねじ山数（25.4mmにつき）：14
ピッチ： 1.8143 mm
オネジ有効長さ： 24.17 mm
オネジ有効径：19 mm以上

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 15.17 mm
PITCH DIAMETER: 24.17 mm



注記
指定外の寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

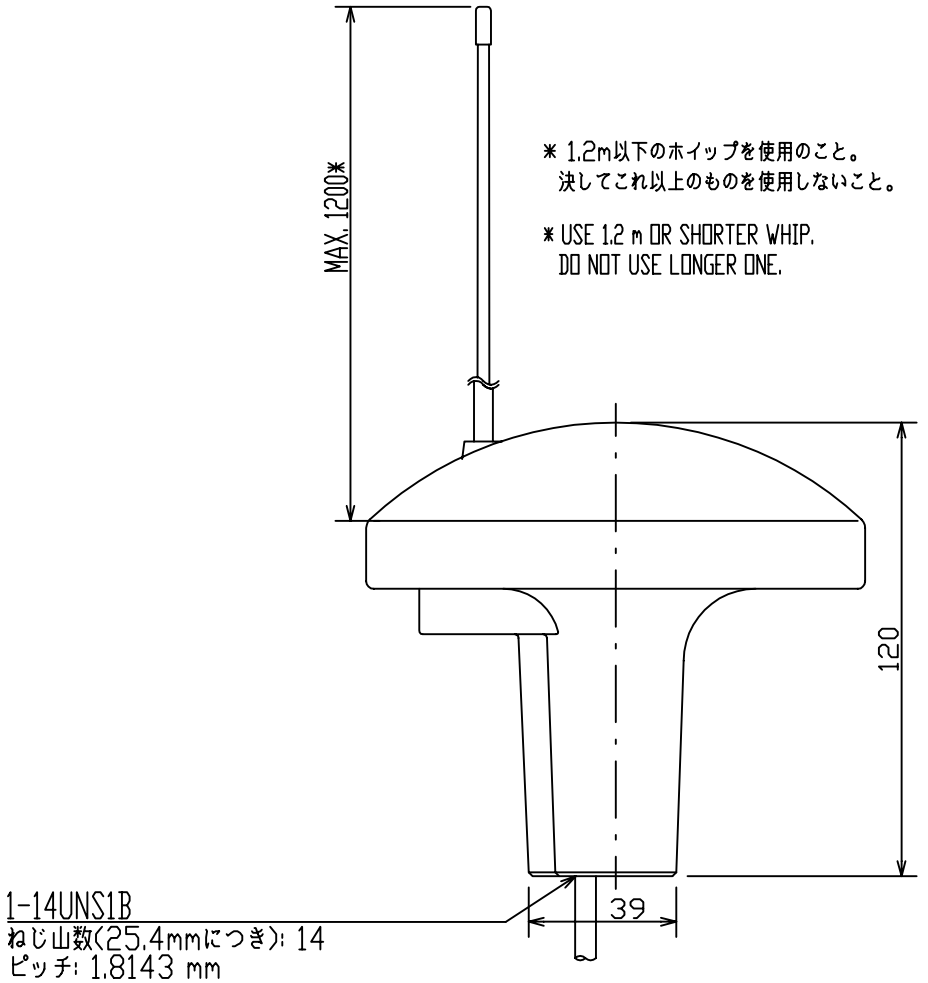
型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量(kg±10%) MASS
GPA-017	10	TNC-P-3	0.6
GPA-017S	0.2	TNC-J-3	0.15

表2 TABLE 2

DRAWN Feb. 19 '03 T.YAMASAKI		TITLE	GPA-017/017S
CHECKED Feb. 19 '03 Y.KIMURA		名称	空中線部
APPROVED Feb. 19, '03 Y. Kimura			外寸図
SCALE 1/1 MASS TABLE 2 表2参照		NAME	ANTENNA UNIT
DWG.No. C4384-G04- J			OUTLINE DRAWING

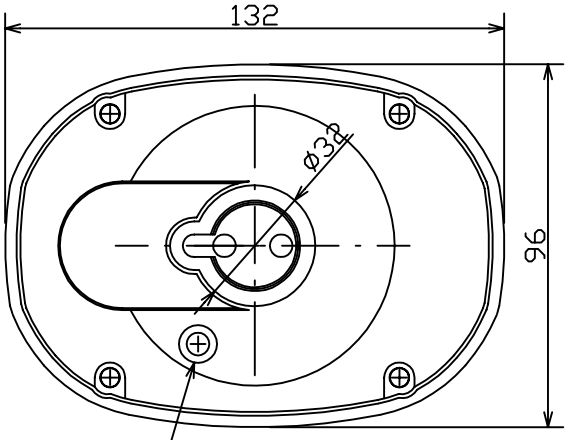
寸法区分 (mm) DIMENSION	公差(mm) TOLERANCE
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

表 1　TABLE 1



＊ 1.2m以下のホイップを使用のこと。
決してこれ以上のものを使用しないこと。

＊ USE 1.2 m OR SHORTER WHIP.
DO NOT USE LONGER ONE.



注記
1) 指定なき寸法公差は表 1 による。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量(kg±10%) MASS
GPA-018	10	TNC-P-3	0.79
GPA-018S	0.2	TNC-J-3	0.35

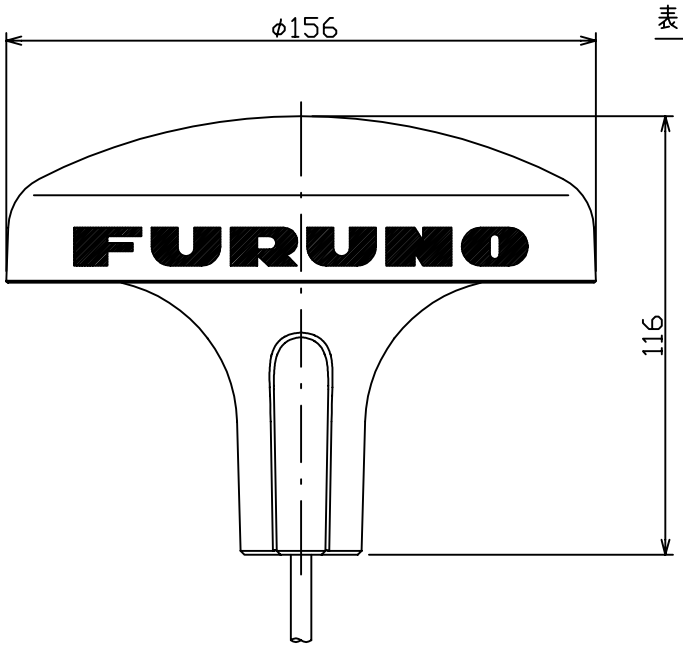
表 2　TABLE 2

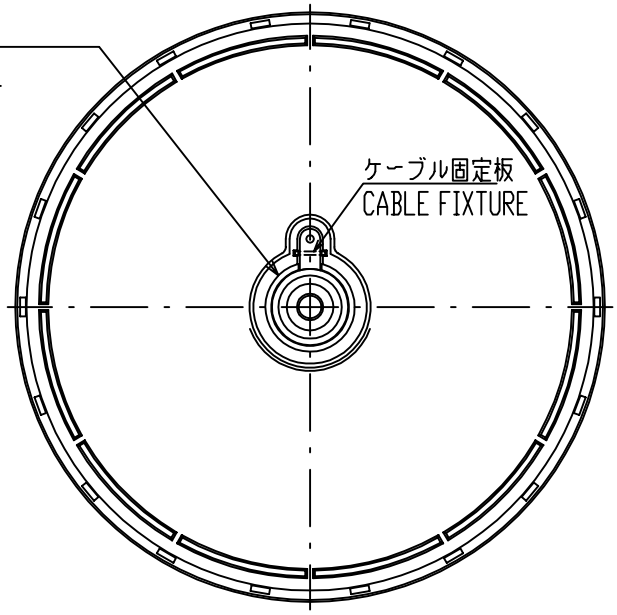
DRAWN Feb. 19 '03 T.YAMASAKI		TITLE	GPA-018/018S
CHECKED Feb. 19 '03 Y.KIMURA		名称	空中線部
APPROVED Feb. 19, '03 Y. Kimura			外寸図
SCALE 1/2 MASS TABLE 2 表2参照		NAME	ANTENNA UNIT
DWG. No. C4385-G01- J			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表1 TABLE 1





1-14UNS1B

ねじ山数(25.4mmにつき): 14
ピッチ: 1.8143 mm
オネジ有効長さ: 15.17 mm
オネジ有効径: 24.17 mm

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 15.17 mm
PITCH DIAMETER: 24.17 mm

型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量 (kg±10%) MASS
GPA-019	10	TNC-P-3	1.0
GPA-019S	0.2	TNC-J-3	0.54

表2 TABLE 2

注記: 指定外の寸法公差は表1による

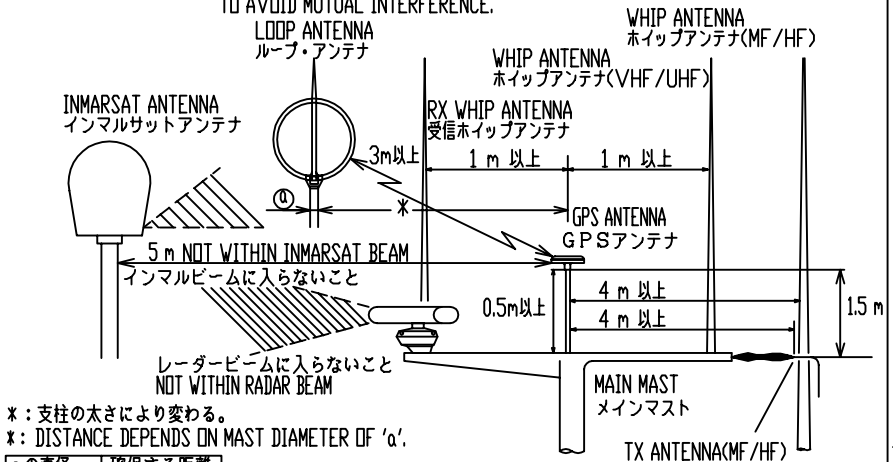
NOTE: TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Feb. 19 '03 T.YAMASAKI		TITLE	GPA-019/019S
CHECKED Feb. 19 '03 Y.KIMURA		名称	空中線部
APPROVED Feb. 19, '03 Y. Kimura			外寸図
SCALE 1/2 MASS TABLE 2 表2参照		NAME	ANTENNA UNIT
DWG. No. C4400-G01-F			OUTLINE DRAWING

FURUNO

取付場所
MOUNTING LOCATION

他の機器のアンテナから下の図の距離以上離す。
THIS FIGURE SHOWS THE SEPARATION DESTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.

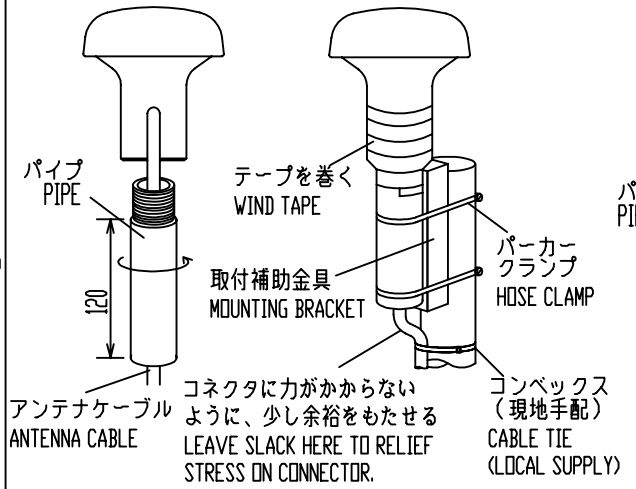


＊：支柱の太さにより変わる。
＊: DISTANCE DEPENDS ON MAST DIAMETER OF 'a'.

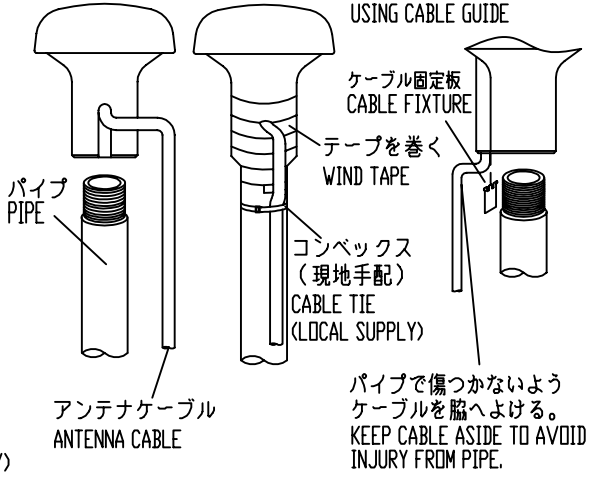
a の直径 DIA. OF 'a'	確保する距離 DISTANCE (MIN.)
10 cm	1.5 m
30 cm	3 m

A）マストへの取付け　MAST MOUNTING

a)マスト取付金具CP20-01111(工事材料)でマストに固定する。
USE MAST MOUNTING KIT CP20-01111.



b)パイプのみを使うとき
USE A PIPE ONLY.

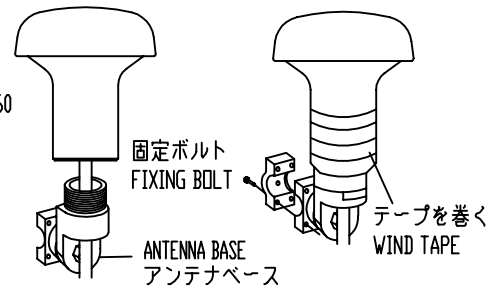


B）スタンションやパルピットにつけるとき

レール用アンテナベース No.13-RC5160
（取付可能レール直径：ø19~ø32）
（コード番号：000-806-114）

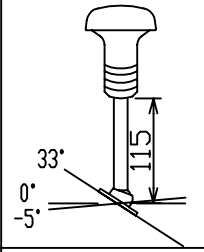
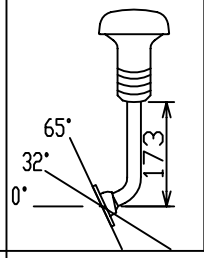
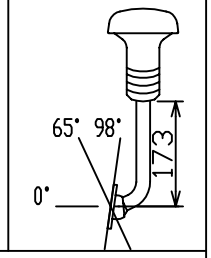
HANDRAIL MOUNTING

USE HANDRAIL MOUNTING BASE No.13-RC5160 (CODE No.000-806-114, OPTION).
THE DIAMETER OF THE HANDRAIL MAY BE FROM ø19mm TO ø32mm.

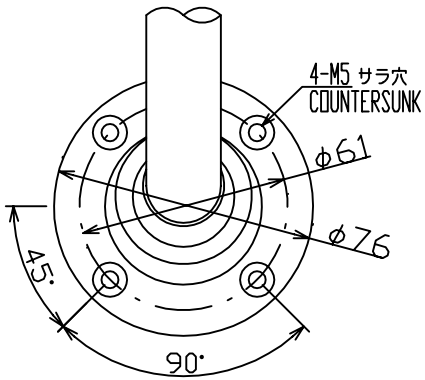


C）取付ける場所が傾斜しているとき　ANTENNA BASE MOUNTING

オプションのアンテナベースを使う。
USE OPTIONAL ANTENNA BASE.

傾斜 INCLINATION	-5° - 33°	32° - 65°	65° - 98°
装備方法 MOUNTING METHOD			
アンテナベース型式 ANT. BASE TYPE コード番号 CODE No.	直型アンテナベース RIGHT ANGLE ANTENNA BASE No.13-QA330 000-803-239	L型アンテナベース L-TYPE ANTENNA BASE No.13-QA310 000-803-240	

アンテナベース基部
MOUNTING DIMENSIONS OF ANTENNA BASE.



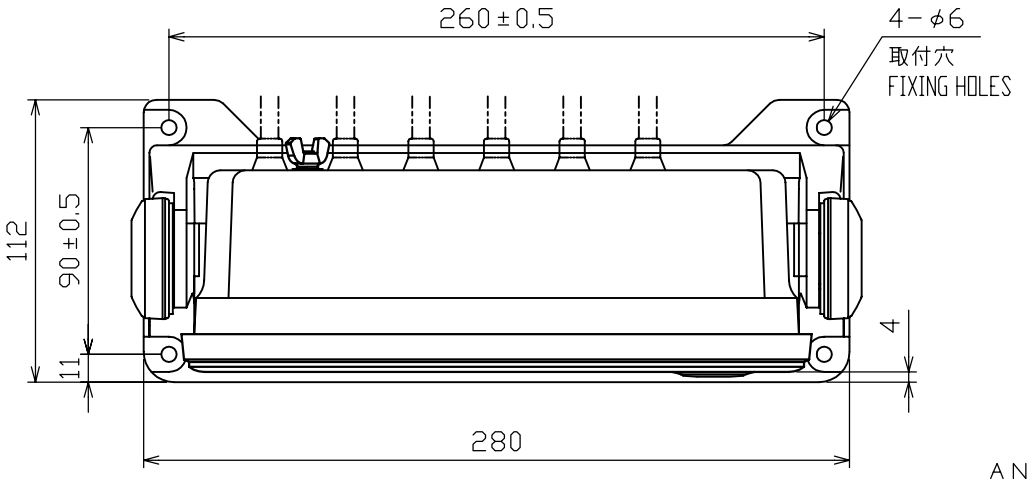
注記 1）パイプやアンテナベースはアンテナユニットにねじ込んだ後に固定する。
2）アンテナを固定するときはパイプ（アンテナベース）をアンテナにねじ込むこと。
アンテナ側をねじるとコネクタ部やケーブルに無理がかかり、故障の原因となる。

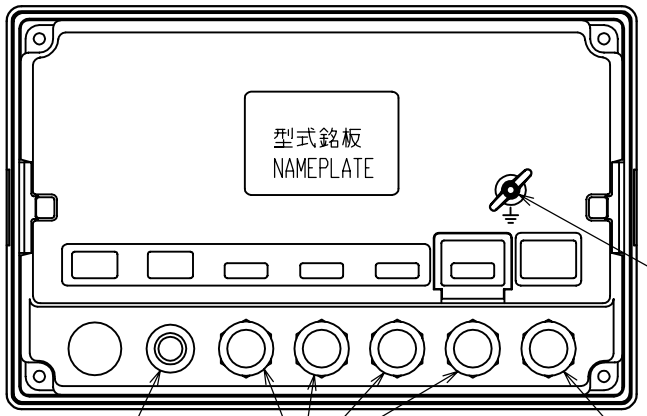
NOTE 1. FASTEN PIPE(ANTENNA BASE) TO ANTENNA UNIT FIRST THEN FIX THEM TO MAST OR HANDRAIL.
2. WHEN FIXING ANTENNA, TURN PIPE OR ANTENNA BASE; NOT THE ANTENNA. TURNING THE ANTENNA MAY TWIST THE CABLE AND PLACE STRESS ON CONNECTOR.

DRAWN	July 22 '02 T.YAMASAKI	TITLE	GPA series
CHECKED	July 22 '02 Y.KIMURA	名称	空中線部
APPROVED	July 22, '02 Y. Kimura		装備要領図
SCALE	MASS	NAME	ANTENNA UNIT
DWG.No.	C4384-Y01- A		INSTALLATION PROCEDURE

FURUNO ELECTRIC CO., LTD.

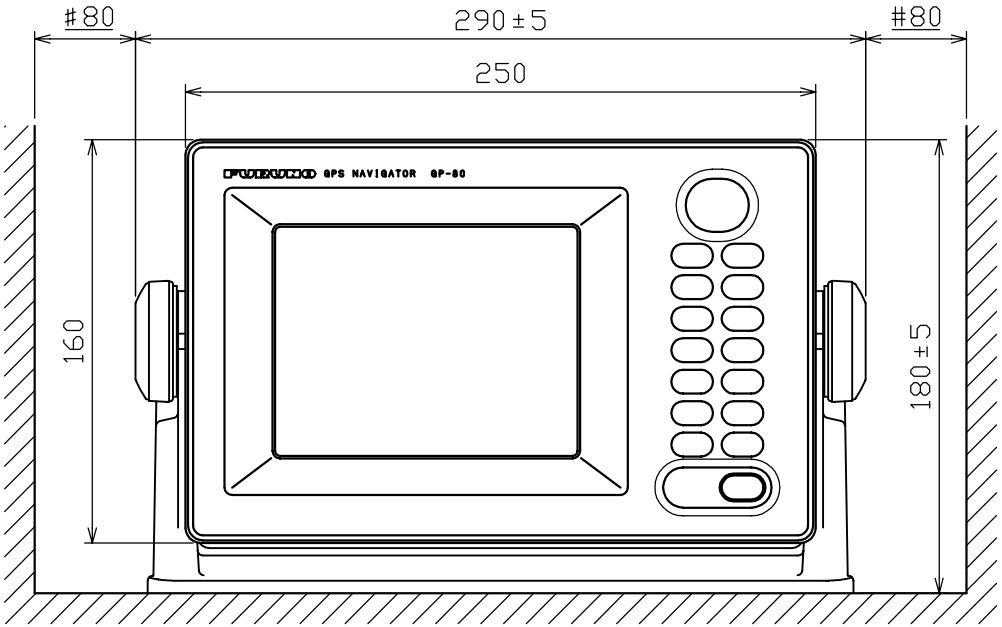
FURUNO

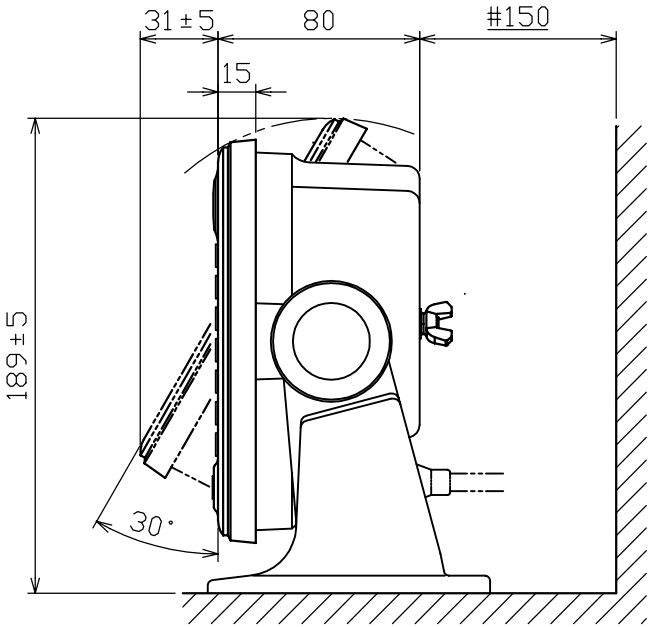




寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表1 TABLE 1





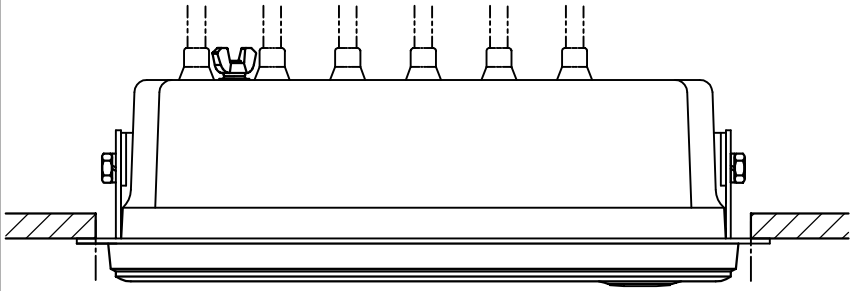
注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表1による。
　　3）取付用ネジは＋トラスタッピンネジ呼び径５×２０を使用のこと。

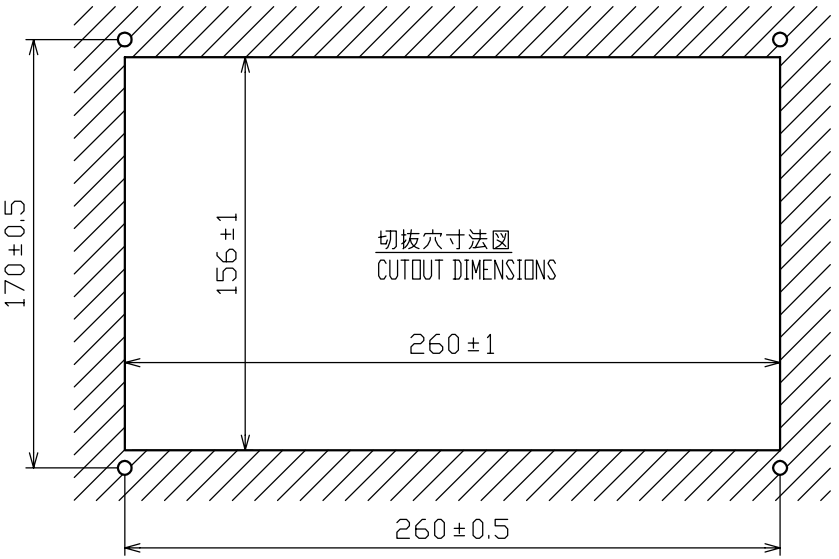
NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
　　2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3. USE TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

DRAWN Feb. 28 '03 T.YAMASAKI		TITLE	GPR-020
CHECKED Feb. 28 '03 Y.KIMURA		名称	受信演算部（卓上装備）
APPROVED Feb. 28. '03 Y. Kimura	GP-80		外寸図
SCALE 1/3 MASS 2.2 ±10% kg	ビーコン付のとき: 2.4 kg±10% MASS W/ BEACON BOARD: 2.4 kg±10%	NAME	RECEIVER UNIT (DESKTOP MOUNT)
DWG.No. C4374-G01- E	20-013-100G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

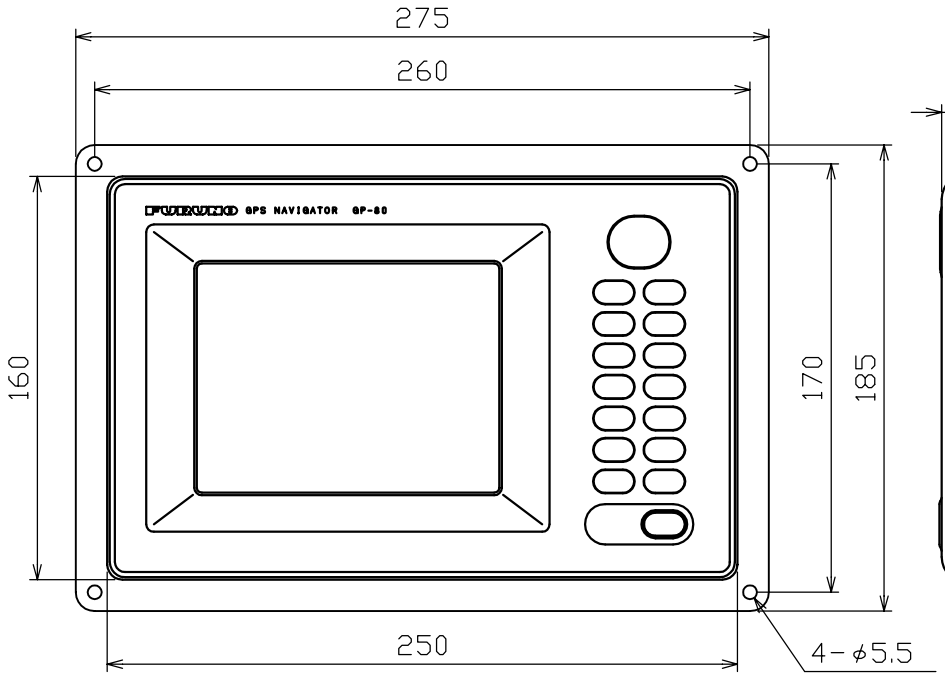
FURUNO

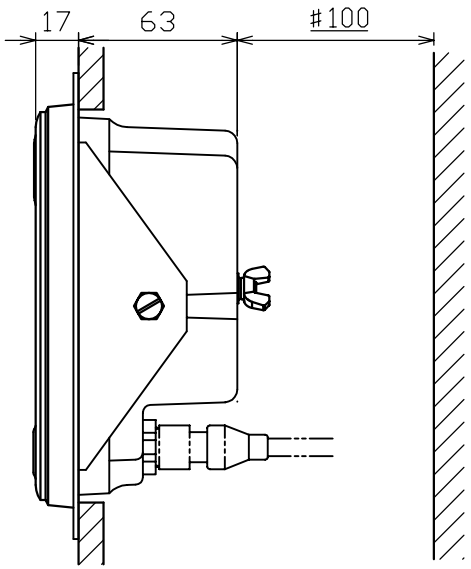


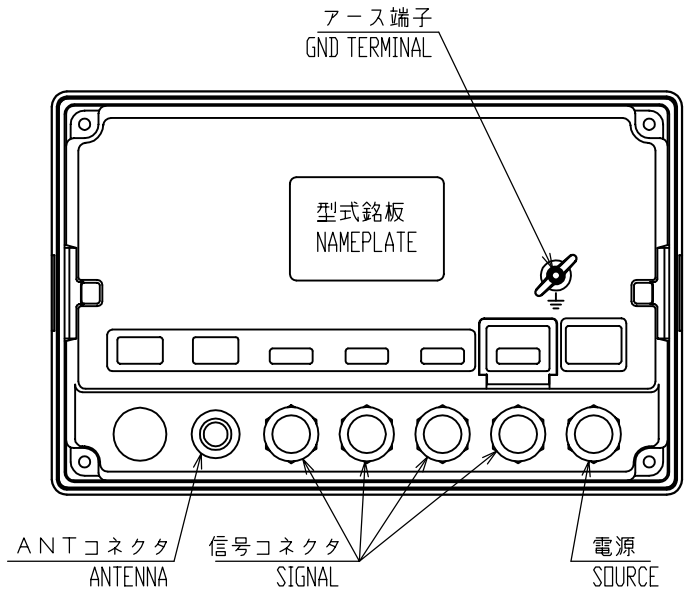


寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表1 TABLE 1







注 記 1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表1による。
3） 取付用ネジは＋トラスタッピンネジ呼び径5×20を使用のこと。

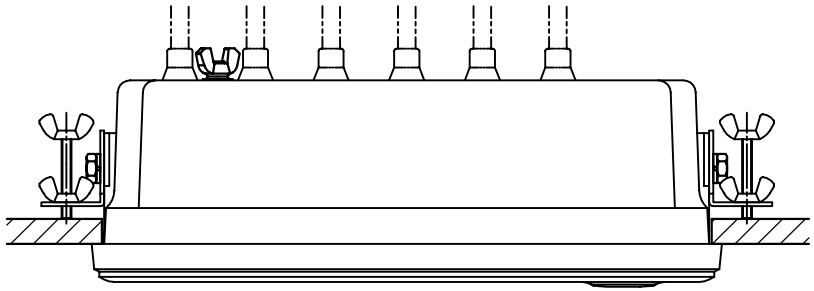
NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

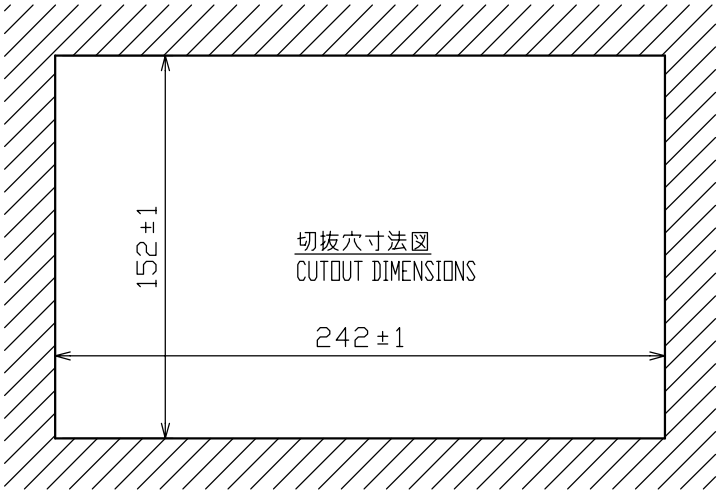
DRAWN Feb. 28 '03 T.YAMASAKI		TITLE	GPR-020
CHECKED Feb. 28 '03 Y.KIMURA		名称	受信演算部（埋込装備F）
APPROVED Feb. 28, '03 Y. Kimura	GP-80		外寸図
SCALE 1/3 MASS 2.2 ±10% kg	ビーコン付のとき: 2.4 kg±10% MASS W/ BEACON BOARD: 2.4 kg±10%	NAME	RECEIVER UNIT (FLUSH MOUNT F)
DWG.No. C4374-G02-E	20-013-1126-1		OUTLINE DRAWING

D-3

FURUNO ELECTRIC CO., LTD.

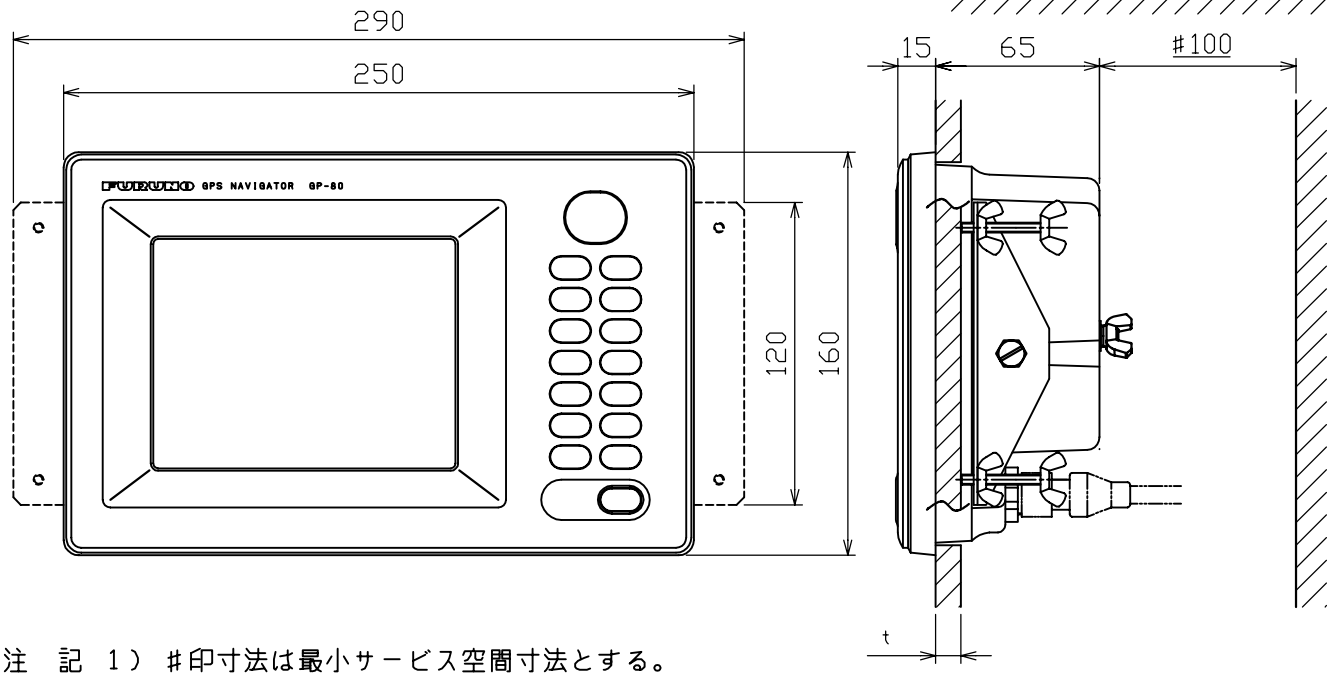
FURUNO





寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表1 TABLE 1



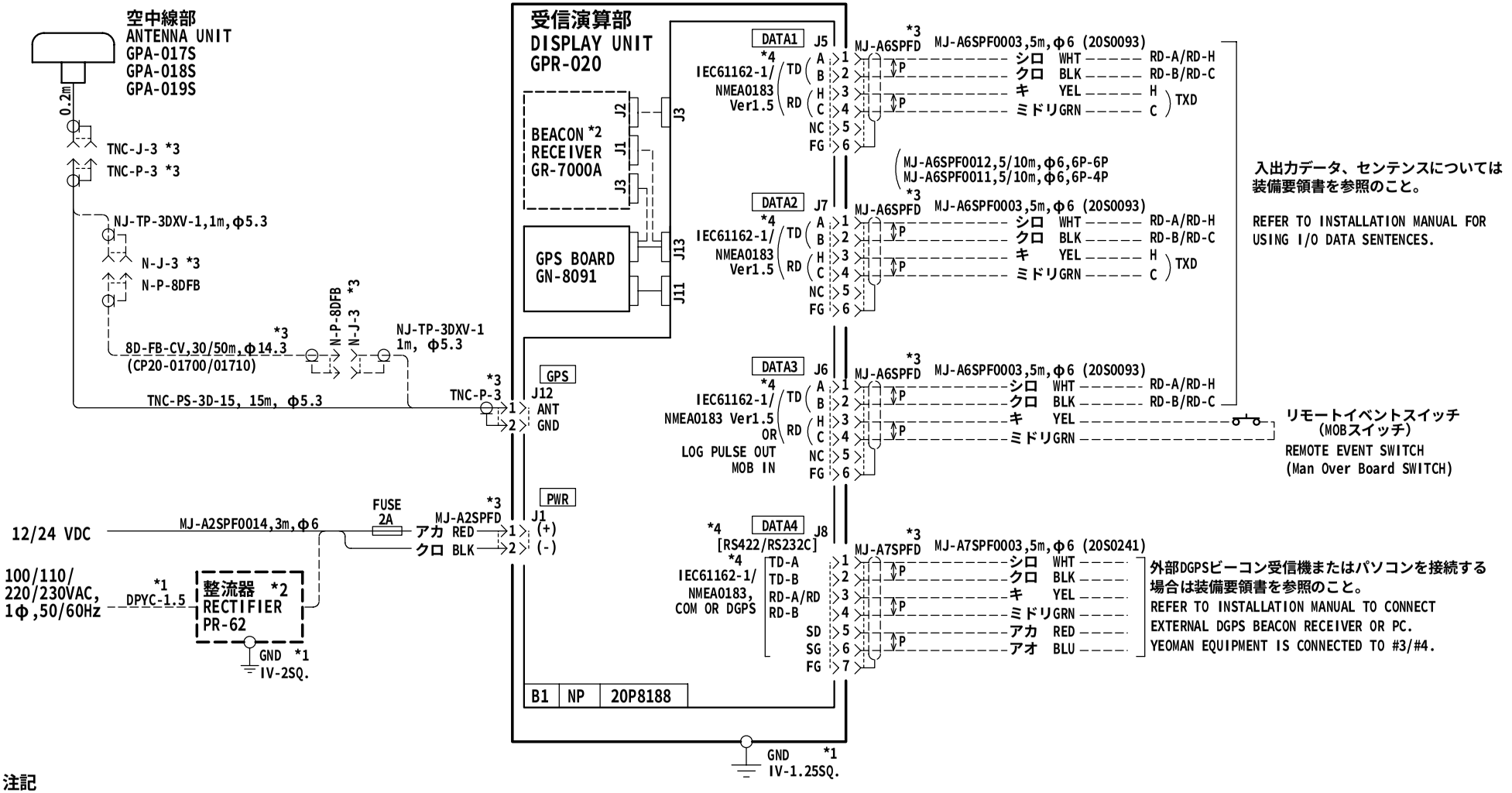
注　記　1）＃印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表1による。
　　3）壁の厚さ（t）は、12までとする。

NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
　　2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3. THICKNESS OF BULKHEAD (t) SHOULD BE WITHIN 12 mm.

DRAWN Feb. 28 '03 T.YAMASAKI		TITLE	GPR-020
CHECKED Feb. 28 '03 Y.KIMURA		名称	受信演算部（埋込装備）
APPROVED Feb. 28, '03 Y. Kimura	GP-80		外寸図
SCALE 1/3 MASS 2.2 ±10% kg	ビーコン付のとき: 2.4 kg±10% MASS W/ BEACON BOARD: 2.4 kg±10%	NAME	RECEIVER UNIT (FLUSH MOUNT S)
DWG.No. C4374-G03- E	20-013-111G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



注記
＊1）造船所手配。
＊2）オプション。
＊3）コネクタは工場にて取付済み。
＊4）メニューにて選択。

NOTE
*1. SHIPYARD SUPPLY.
*2. OPTION
*3. FITTED AT FACTORY.
*4. SELECTABLE ON MENU.

DRAWN Sep. 26 '03 T. NISHINO			TITLE GP-80
CHECKED Takahashi T.			名称 GPS航法装置
APPROVED Y. Hatai			相互結線図
SCALE	MASS kg		NAME GPS NAVIGATOR
DWG NO. C4374-C05- C		20-013-5007-0	INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

S-1